

# Narcotic Addiction and BFP Reactions in Tests for Syphilis

AD HARRIS, LEONARD BROWN, M.D., JOSEPH PORTNOY, Ph.D., and ELEANOR V. PRICE

SEVERAL unpublished reports have indicated that an unusually large percentage of narcotic addicts have biologically false positive reactions in tests for syphilis. A recent publication by Boak and associates (1) states, "One hundred and sixty-three, or 94.8 percent, of 172 sera from narcotic addicts with a reactive serologic test for syphilis exhibited nonreactive TPI tests and were thus considered to be biologic false-positive reactions." Since there is lack of agreement as to what constitutes a biologic false positive reactor, and since little is known about the causes of these reactions, it is evident that further delineation of the relationship of narcotic addiction to biologic false positive reactions in tests for syphilis is needed.

At the invitation of the director of the Venereal Disease Research Laboratory, and with the agreement of the medical officers in charge of the Public Health Service Hospitals in Lexington, Ky., and Fort Worth, Tex., and the medical director, Bureau of Prisons, U.S. Department of Justice, an ad hoc committee was formed to design a study of the effects of narcotic addiction on biologic false positive reactions in tests for syphilis. The following definitions were formulated by this committee.

**Addiction:** The regular use of opiates or opiatelike synthetic drugs will constitute addiction. Withdrawal symptoms or the regular ob-

served administration of narcotics will be considered as definite evidence of addiction, with injection markings and/or history of narcotic use being presumptive evidences of narcotic addiction.

**Biologic false positive (BFP):** A biologic false positive reactor is a patient who has no clinical or historical evidence of syphilis infection and whose blood produces repeated positive reactions in nontreponemal tests for syphilis and negative reactions in the *Treponema pallidum* immobilization (TPI) test and other treponemal tests for syphilis. (Since many patients were lost to medical surveillance before a second blood specimen could be obtained, analyses referring to BFP reactors will not be confined to the committee definition of this category.)

The initial phase of this study was designed to produce data relative to the association of narcotic addiction with biologic false positive reactions in tests for syphilis. Succeeding and more definitive studies in both animals and humans will be necessary to ascertain the ability of the several narcotics or their diluents, or both, to produce BFP reactions in serologic tests for syphilis. This report evaluates the data collected on 721 narcotic addicts.

## Method of Study

Patients for this study were from the Public Health Service Hospitals at Fort Worth, Tex., and Lexington, Ky., the U.S. Penitentiary, Atlanta, Ga., and the Federal Reformatory for Women, Alderson, W. Va.

The participant organizations were required

---

*The authors are with the Communicable Disease Center, Public Health Service. Mr. Harris is the director, Dr. Brown is chief of Medical Research Services, and Dr. Portnoy is assistant director, Venereal Disease Research Laboratory. Mrs. Price is a statistician, Venereal Disease Branch.*

to submit study cards for all patients. Each card contained the following information:

Patient identification number, race, age, and sex.

Evidence or history of venereal disease.

Evidence of other diseases known to cause false biologic reactions.

Immunizations within past 6 weeks.

Clinical impression—syphilis by history or physical findings.

The Venereal Disease Research Laboratory routinely performed four nontreponemal tests—VDRL slide (VDRL), Kolmer complement fixation with cardiolipin antigen (KC), Mazzini flocculation, and Kline flocculation—and one treponemal test, the Kolmer complement fixation test with Reiter protein antigen (KRP), on all first blood specimens. In addition, the TPI, fluorescent treponemal antibody (FTA), and *Treponema pallidum* complement fixation (tpcf-50) tests were performed when reactivity (reactive or weakly reactive result) was observed in any of the first five tests. All eight tests were performed on second specimens. Test results were posted on individual study cards and forwarded to the statistical unit of the Venereal Disease Branch for analysis.

At each institution blood specimens were drawn into vacuum tubes and sent to the Venereal Disease Research Laboratory on the date drawn. Original historical information was sent on the date the patient was examined, which was not necessarily the same day that the blood was drawn. Repeat blood specimens were drawn on request of the Venereal Disease Research Laboratory or upon withdrawal of narcotics, or both. The following additional information was noted on the repeat study cards and forwarded to the Venereal Disease Research Laboratory:

Any significant change which alters the physician's impression of biologic false positive reactor versus syphilis.

If possible, the type of drug the patient takes and method of "shooting."

Recent antibiotic therapy.

### Initial Testing

Among the 721 narcotic addicts tested, definite results in all tests performed were obtained in 93 patients who had a history of syphilis and in 572 who had no such history or for

---

### Ad Hoc Committee

Ad Harris, director, Leonard Brown, M.D., chief, Medical Research Services, Joseph Portnoy, Ph.D., and W. E. Deacon, Ph.D., assistant directors, Venereal Disease Research Laboratory, and W. G. Simpson, M.D., assistant chief, Venereal Disease Branch, Communicable Disease Center, Public Health Service.

Carl I. Pirkle, M.D., chief medical officer, U.S. Penitentiary, Atlanta, Ga.; B. G. Giel, M.D., chief of medical service, Public Health Service Hospital, Lexington Ky.; Paul H. Blachly, M.D., deputy chief, Addict Service, Public Health Service Hospital, Fort Worth, Tex.; and Sidney Olansky, M.D., chairman, department of dermatology, Emory University Clinic, Atlanta, Ga.

---

whom no data were available. Fifty-six additional patients had anticomplementary results in one or more complement fixation tests or testing was incomplete due to insufficiency of serum. Fifty-one serums were anticomplementary in the KC test, 53 in the KRP test, and 50 (7 percent of the patients tested) were anticomplementary in both tests. These 56 cases, which include 2 with a history of syphilis, have been omitted from the tabulations.

As shown in table 1, 403 of the patients with no history of syphilis were nonreactive to all nontreponemal tests. Of the 169 who were reactive to one or more nontreponemal tests, 103 (60.9 percent) were nonreactive to all treponemal tests. In the 93 with a history of syphilis, 76 were reactive to one or more nontreponemal tests; of these, 23 (30.3 percent) were nonreactive to all treponemal tests.

The apparent BFP rate varied among the several nontreponemal and treponemal test combinations (table 2). The above rates are based on the complete battery of eight tests. When based on the entire group of four nontreponemal tests and a single treponemal test—the TPI, for example—the BFP rate was 44.7 percent (34 of 76) for those with a history of syphilis and 78.7 percent (133 of 169) for those without. In those with no history of syphilis the range is from 67.9 percent (Kline-TPI) to

83.6 percent (KC-tpcf-50). For those patients with a history of syphilis, the BFP rate ranges from 38.2 percent (Mazzini-TPI and Mazzini-tpcf-50) to 47.1 percent (VDRL-KRP and Mazzini-KRP).

### Repeat Testing

Repeat blood examinations were made on 174 patients with no history of syphilis and on 62 with a history of syphilis; however, 32 of the 174 serums were retested with the nontreponemal tests and the KRP test only. Differences between the initial and repeat testing, by change in classification or category, are shown in table 3.

Among the 174 patients with no history of syphilis, 134 (77 percent) were classified the same on both tests, including 49 (28.2 percent)

nonreactive to all nontreponemal tests, 35 (20.1 percent) reactive to one or more nontreponemal tests and one or more treponemal tests, and 50 (28.7 percent) reactive to one or more nontreponemal tests and nonreactive to all treponemal tests. Among the 62 patients with a history of syphilis, 52 (83.9 percent) were in the same category on repeat testing, including 37 (59.7 percent) reactive to one or more nontreponemal tests and to one or more treponemal tests, and 15 (24.2 percent) reactive to one or more nontreponemal tests (table 3) and nonreactive to all treponemal tests.

### Treponemal Tests and VDRL Titer

Quantitative results obtained with the VDRL test in 245 patients reactive to one or more nontreponemal tests are recorded in table 4. In

**Table 1. Serologic pattern in narcotic addicts with and without a history of syphilis**

Result of treponemal antigen tests	Result of nontreponemal antigen tests											
	All nonreactive		1 reactive		2 reactive		3 reactive		All reactive		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
No history of syphilis												
All nonreactive.....	(1)	(1)	46	8.0	15	2.6	14	2.4	28	4.9	103	18.0
1 reactive.....	3	0.5	9	1.6	5	.9	3	.5	14	2.4	34	5.9
2 reactive.....	2	.3	2	.3	1	.2	6	1.0	9	1.6	20	3.5
3 reactive.....	1	.2	2	.3	1	.2	3	.5	1	.2	8	1.4
All reactive.....	0	0	1	.2	2	.3	0	0	7	1.2	10	1.7
KRP nonreactive, others not done.....												
Total.....	397	69.4	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	397	69.4
History of syphilis												
All nonreactive.....	(1)	(1)	4	4.3	2	2.2	3	3.2	14	15.1	23	24.7
1 reactive.....	1	1.1	1	1.1	1	1.1	1	1.1	5	5.4	9	9.7
2 reactive.....	0	0	1	1.1	0	0	1	1.1	5	5.4	7	7.5
3 reactive.....	0	0	1	1.1	1	1.1	0	0	10	10.8	12	12.9
All reactive.....	0	0	0	0	0	0	3	3.2	23	24.7	26	28.0
KRP nonreactive, others not done.....												
Total.....	16	17.2	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	16	17.2
Total.....	17	18.3	7	7.5	4	4.3	8	8.6	57	61.3	93	100.0

<sup>1</sup> No testing in this area.

NOTE: Detailed tables showing results of individual tests may be obtained from the Venereal Disease Branch Communicable Disease Center, Public Health Service, Atlanta 22, Ga.

the group of 169 patients who gave no history of syphilis, the VDRL test was nonreactive in 64 (37.9 percent), weakly reactive in 43 (25.4 percent), reactive 2 dils or less in 44 (26.0 percent), and reactive 4 dils or more in 18 (10.7 percent). It was only in the group reactive to 4 dils or more that the results of the treponemal tests bore any obvious relationship to the VDRL

titer. Here the BFP rate was 38.9 percent compared with rates ranging from 68.8 percent among those nonreactive to the VDRL test but showing reactivity to one or more of the other nontreponemal tests to 59.1 percent among patients with a VDRL titer of 2 dils or less. Also, 22.2 percent of the patients with a VDRL titer of 4 dils or more were reactive to all treponemal

**Table 2. Percentage of biologic false positive reactions by indicated test combinations**

Treponemal antigen tests	History of syphilis	Nontreponemal antigen tests				
		VDRL	Mazzini	KC	Kline	Total <sup>1</sup>
TPI-----	{No-----	75.2	69.7	80.0	67.9	78.7
	{Yes-----	42.6	38.2	43.8	38.8	44.7
tpcf-50-----	{No-----	78.1	77.8	83.6	73.1	82.2
	{Yes-----	41.2	38.2	45.3	38.8	44.7
FTA-----	{No-----	75.2	72.7	80.0	70.5	79.9
	{Yes-----	45.6	42.6	45.3	43.3	46.1
KRP-----	{No-----	82.9	79.8	82.1	76.9	83.4
	{Yes-----	47.1	47.1	46.9	46.3	51.3
All tests <sup>2</sup> -----	{No-----	56.2	49.5	62.1	44.9	60.9
	{Yes-----	29.4	25.0	29.7	25.4	30.3

<sup>1</sup> Reactive to 1 or more nontreponemal tests.

<sup>2</sup> Nonreactive to all treponemal tests.

**Table 3. Change in category between initial and repeat examinations of blood specimens from 236 patients**

Repeat specimen	Initial specimen							
	All nontreponemal tests and KRP test nonreactive		1 or more tests reactive <sup>1</sup>		1 or more nontreponemal tests reactive; all treponemal tests nonreactive		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
No history of syphilis-----	57	32.8	52	29.9	65	37.4	174	100.0
All nontreponemal tests nonreactive:								
1 or more treponemal tests reactive-----	3	1.7	4	2.3	0	0	7	4.0
All treponemal tests nonreactive-----	14	8.0	2	1.1	12	6.9	28	16.1
KRP nonreactive, other tests not done-----	32	18.4	0	0	0	0	32	18.4
1 or more nontreponemal tests reactive:								
1 or more treponemal tests reactive-----	1	.6	35	20.1	3	1.7	39	22.4
All treponemal tests nonreactive-----	7	4.0	11	66.3	50	28.7	68	39.1
History of syphilis-----	0	0	43	69.4	19	30.6	62	100.0
All nontreponemal tests nonreactive:								
1 or more treponemal tests reactive-----	0	0	2	3.2	0	0	2	3.2
All treponemal tests reactive-----	0	0	1	1.6	0	0	1	1.6
1 or more nontreponemal tests reactive:								
1 or more treponemal tests reactive-----	0	0	37	59.7	4	6.5	41	66.1
All treponemal tests nonreactive-----	0	0	3	4.8	15	24.2	18	29.0

<sup>1</sup> Both nontreponemal and treponemal.

tests compared with an average of approximately 4 percent for the other three titer groups.

#### Causes of BFP Reactions

The number of patients giving a history of diseases or conditions that might cause BFP reactions was too small to affect materially the BFP rate among patients with no history of syphilis. Fifty-three gave a history of hepatitis; 36 percent of these were reactive to one or more nontreponemal tests, and 79 percent were nonreactive to all treponemal tests. These rates compare with 33 percent and 54 percent

respectively of the 474 patients who gave no history of other disease or recent immunizations. The period between hepatitis and admissions to a hospital or penal institution was less than 1 year for 11 patients, 1 to 3 years for 17, and more than 3 years, or time unspecified, for 25. In these groups the percentages of patients reactive to nontreponemal tests were 36, 35, and 36 respectively, and the percentages classified as BFP, 75, 100, and 67. Although there may have been some association between disease history and serologic reactivity in these groups, no statistical significance can be attached to these figures because of the small number of cases.

**Table 4. Result of treponemal tests in 245 patients reactive to one or more nontreponemal tests, according to VDRL titer**

Treponemal test results		VDRL quantitative test results									
		Total	Non-reactive	Weakly reactive	Reactive						
					2 dils or less		4 dils or more				
					History of syphilis						
		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Total tests-----{Number--		169	76	64	8	43	14	44	32	18	22
-----{Percent--		100. 0	100. 0	37. 9	10. 5	25. 4	18. 4	26. 0	42. 1	10. 7	28. 9
All nonreactive-----{Number--		103	23	44	3	26	6	26	10	7	4
-----{Percent--		60. 9	30. 3	68. 8	37. 5	60. 5	42. 9	59. 1	31. 3	38. 9	18. 2
1 reactive-----{Number--		31	8	12	2	6	1	10	2	3	3
-----{Percent--		18. 3	10. 5	18. 8	25. 0	14. 0	7. 1	22. 7	6. 3	16. 7	13. 6
TPI-----		7	2	2	1	2	0	1	1	2	0
tpcf-50-----		7	3	2	0	2	1	2	0	1	2
FTA-----		9	2	4	1	2	0	3	0	0	1
KRP-----		8	1	4	0	0	0	4	0	1	0
2 reactive-----{Number--		18	7	3	1	7	0	5	5	3	1
-----{Percent--		10. 7	9. 2	4. 7	12. 5	16. 3	0	11. 4	15. 6	16. 7	4. 5
TPI, tpcf-50-----		7	0	2	0	3	0	1	0	1	0
TPI, FTA-----		4	3	0	0	2	0	1	3	1	0
TPI, KRP-----		2	1	1	0	0	0	1	0	0	1
tpcf-50, FTA-----		3	1	0	0	1	0	2	1	0	0
tpcf-50, KRP-----		0	1	0	0	0	0	0	1	0	0
FTA, KRP-----		2	1	0	1	1	0	0	0	1	0
3 reactive-----{Number--		7	12	3	2	2	1	1	6	1	3
-----{Percent--		4. 1	15. 8	4. 7	25. 0	4. 7	7. 1	2. 3	18. 8	5. 6	13. 6
TPI, tpcf-50, FTA-----		1	5	0	2	0	1	1	1	0	1
TPI, tpcf-50, KRP-----		1	4	1	0	0	0	0	4	0	0
TPI, FTA, KRP-----		4	1	2	0	1	0	0	0	1	1
tpcf-50, FTA, KRP-----		1	2	0	0	1	0	0	1	0	1
All reactive-----{Number--		10	26	2	0	2	6	2	9	4	11
-----{Percent--		5. 9	34. 2	3. 1	0	4. 7	42. 9	4. 5	28. 1	22. 2	50. 0

Twenty-one other patients gave histories of jaundice, chickenpox, malaria, or upper respiratory infections. Eight (38 percent) were reactive to one or more nontreponemal tests and, of these, three (38 percent) were nonreactive to all treponemal tests.

Among the patients who gave no history of syphilis, 12 had had typhoid, tetanus, or smallpox immunizations, or all three, within 6 weeks prior to admission. Only one showed serologic activity and that to the KC test only (2 dils). Seven additional patients received smallpox and tetanus immunizations between admission and repeat examination. All were reactive to one or more nontreponemal tests, and three were also reactive to one or more treponemal tests at time of admission. Following the immunizations, no changes were observed in results of either the KC or KRP tests. In the other tests the changes, from one to three in number, were generally from weakly reactive to reactive or nonactive, or vice versa, and were about equally divided in direction. In this small group of 19 cases there is nothing to indicate that tetanus, typhoid, or smallpox inoculations had any effect on serologic test results.

## Discussion

This study was originally designed to include testing of a second blood specimen from all patients showing reactivity in nontreponemal tests for syphilis. Many patients were admitted to the Public Health Service Hospitals without a requirement that they stay in the hospital for completion of therapy. A large number left the hospital on their own initiative before a second blood specimen could be taken, and second specimens were not taken from others because of severely thrombosed veins. For these reasons, only 236 patients were retested. Since only 77 percent of the probable BFP reactors, those with reactive nontreponemal and nonreactive treponemal tests without history of syphilis, were confirmed by repeat testing, and since the second blood specimen was taken during withdrawal of narcotics, this type of reaction in narcotic addicts may be a variable that is influenced by the condition of the patient at the time blood is taken for testing. Whatever criterion is used, the number of BFP reactions

obtained is very high, and the reactions appear to be associated with narcotic addiction.

Patients with a history of syphilis had a greater tendency toward reactivity in more nontreponemal and treponemal tests than patients with no such history. Of the 77 patients with a history of syphilis who reacted to one or more tests, 65, or 84 percent, manifested reactivity in at least three of the nontreponemal tests compared with 85 of 175 patients, or approximately 49 percent, with no history of syphilis. In the patients with a history of syphilis approximately 49 percent were reactive in at least three treponemal tests compared with only 10 percent in the group with no history of syphilis.

When only one nontreponemal test was reactive, the KC test was significantly more reactive than the other tests; in the group with no history of syphilis 46 to 60 patients showed reactivity in the KC test only. However, in the patients with a history of syphilis, five of seven demonstrated this serologic pattern. On the other hand, when only one treponemal test was reactive, a significantly higher reactivity rate for any one treponemal test was not observed in patients with or without a history of syphilis.

The occurrence of anticomplementary results, as reflected in KRP and KC tests, in approximately 8 percent of patients with no history of syphilis stands in contrast to approximately 1 percent in patients with a history of syphilis. If the percentage of anticomplementary reactions is calculated for the entire group of 721 patients, the figure of 7 percent obtained is significantly higher than encountered in the general population.

The TPI test has been used as a tool for determining BFP reactions and has served as a standard against which other treponemal tests have been compared. Based on findings with a single blood specimen, a reactive result in one or more of the nontreponemal tests and a nonreactive result in the TPI test indicated a BFP rate of 44.7 percent in patients with a history of syphilis compared with 78.7 percent in patients without a history of syphilis. Based on similar considerations, the greatest deviation from the TPI test was observed with the KRP test, which showed percentages of 51.3 and 83.4 respectively for patients with and without a history of syphilis.

From the large group of patients whose tests fall between the two extremes of "all treponemal tests nonreactive" and "all treponemal tests reactive," it is obvious that the BFP rate can be altered materially by the treponemal test or tests selected for determining the presence or absence of syphilis. For example, if the BFP rate among patients with no history of syphilis were based on a single treponemal test, it would jump from 61 percent to about 81 percent, 79 percent for TPI and 83 percent for KRP (table 2). Or, if all four treponemal tests were used, it could be reasoned that no significance should be attached to one reactive report out of four. The 31 patients with one reactive treponemal test would then be added to the 103 nonreactive to all tests, for a BFP rate of 79 percent (table 4). On the other hand, if reactivity in any one treponemal test is considered evidence of past or present syphilis, the large number of nonreactive tests among patients with discrepant results suggests that some patients with past syphilis will be nonreactive to all treponemal tests, and that the 103 patients nonreactive to all treponemal tests include some who have had syphilis. This is obviously true, and to no small extent, since 30 percent of the patients with a history of syphilis were nonreactive to all of the treponemal tests.

This study was designed to determine the pattern of results that would be obtained in prescribed serologic tests for syphilis on blood specimens from unselected narcotic addicts. The number of reactive or positive results produced by syphilis, past or present, can only be surmised since statements made by these patients regarding previous infection and treatment would certainly not be highly reliable. The total reactivity of serologic tests for syphilis in the narcotic addict group would, however, indicate that syphilis is probably present in a larger proportion of these individuals than in the random population. Although half of the sero-

logically reactive addicts may represent BFP reactors, the total percentage of reactors is so large that it recommends a high level of suspicion regarding syphilis to the examining physician.

Information obtained in this study does not shed light on the exact cause of BFP reactions in narcotic addicts. Narcotics as personally used by addicts are usually "cut" with additives that may of themselves be responsible for some serologic responses in the user. The possible effects of these substances alone or in combination with narcotics have not yet been determined.

### Summary

Blood from 721 narcotic addict patients was tested with four treponemal and four nontreponemal tests for syphilis.

Approximately 37 percent of these blood specimens were reactive in one or more nontreponemal tests, and approximately half of these reactive specimens were nonreactive in all four treponemal tests (BFP pattern).

Since only 77 percent of the BFP reactions were confirmed by repeat testing, this type of reaction may be transitory in some narcotic addicts.

The high rate of apparent BFP reactions in serologic tests for syphilis obtained in this study appears to be associated with the use of narcotics.

The high rate of reactivity in treponemal tests indicates the probability of a high syphilis rate in this study group.

### REFERENCE

- (1) Boak, R. A., Carpenter, C. M., and Miller, J. N.: Biologic false-positive reactions for syphilis among narcotic addicts. A report on the incidence of BFP reactions as measured by TPI tests. *J.A.M.A.* 175: 326, Jan. 28, 1961.

## Program Notes

Ice is useful both in the home as a first-aid remedy for minor burns and in the doctor's office as a pain-killer, according to Dr. Robert W. Virtue, University of Colorado Medical Center.

Ice, said Dr. Virtue, is better first aid for burns than butter, the common household treatment, because it relieves pain and keeps down swelling. Also, if ice is held on the skin for a minute or so before an injection, it deadens the pain of the needle. This would be extremely helpful for children, who fear pain and must take many shots.

« »

The Public Health Service has established a small experimental nursing field center at the Public Health Service Hospital in San Francisco, Calif., to collaborate with hospitals and health agencies in San Francisco in developing new methods of teaching nursing effectively, and to devise standards of quality for nursing care.

« »

A sensitive test which charts the production in human blood of antibodies against malaria is being used with good preliminary results at the National Institutes of Health. The test, described in the March 30, 1962, issue of *Science*, is a modification of the fluorescent antibody technique.

« »

Nursing homes for the aged should be brightly lighted and noisy, according to Dr. Ewald W. Busse, Duke University's center for the study of aging. Age limits the eye's ability to adapt to darkness and its ability to distinguish between different intensities of light.

Age also affects the threshold of hearing. The elderly can hear conversations when people speak loudly

in competition with other noises, but in a quiet room deafness becomes apparent since the person talking automatically drops his voice.

« »

The first stage of a study designed to gauge the effects of climate and heredity on arthritis and rheumatism has been completed among the Blackfeet Indians of Montana.

The study team, headed by Dr. Thomas A. Burch, National Institute of Arthritis and Metabolic Diseases, gave some 1,000 Indians over 29 years of age an examination consisting of special blood tests and X-rays of hands, feet, neck, and spine. The results of these tests can be objectively compared with results from studies made in other populations.

The second half of the survey will be conducted on a tribe in Arizona.

« »

The New Jersey State Department of Health cooperated with numerous private and local agencies in providing basic health care for migrant workers in the State in 1961, including tuberculin testing, with X-rays of positive reactors; immunization against poliomyelitis, diphtheria, pertussis, and tetanus; dental care for children; and testing for venereal infection, with follow-up. Other medical care and hospitalization were arranged as needed.

The details appear in "Health Activities Among Agriculture Workers in New Jersey," available from the State health department.

« »

A 3-year project to find out precisely how illness spreads through a community is being undertaken in Levittown, N.J., by the New Jersey State Department of Health with the aid of a grant from the Public Health Service.

All physicians in the area will submit daily reports of new acute illness. Project workers will tabulate these records and plot the cases on a map. In addition, sewage will be tested for infectious organisms, specimens will be collected from both sick persons and controls, and efforts will be made to correlate viruses found in human beings with those found in sewage. To avoid delays in processing specimens, fluorescent antibody techniques will be used to identify streptococcal organisms.

« »

An Institute of Peace Science has been established at the University of Hiroshima. The institute, supported by donations, will house an international library of peace science.

« »

Single copies of "Nursing Education Programs Today," a booklet issued by the National League for Nursing, are available free on request to the National League for Nursing, 10 Columbus Circle, New York 19, N.Y.

« »

A review of court decisions regarding fluoridation of water supplies has been published in the January, 1962 issue of *Public Works* by Dr. James A. Tobey, a member of the New York bar.

« »

Deaths from lead poisoning in Philadelphia decreased to 9 in 1961 from 12 in 1960. At the same time, reported cases increased from 56 to 116 as a result of intensive efforts by the city health department to find and diagnose this disease early.

Kits with instructions for obtaining specimens are issued at eight district health centers, which also receive specimens from physicians and hospitals and relay them to an industrial laboratory for analysis.

« »

Four hundred Indian school children in the Phoenix, Ariz., area are being vaccinated against trachoma by the Public Health Service. The vaccine has been tested successfully in Portugal, Ethiopia, Hong Kong, and Boston.



## Studies of Aging

The variety of experimental and theoretical studies of the phenomenon of aging being conducted at the University of Chicago are reviewed in the November 1961 issue of the university's publication, *Reports*.

In a nationwide survey to learn more about problems of the aged related to illness and money, the National Opinion Research Center, affiliated with the university, found:

- Three out of four people over age 65 seem to believe that most people cannot save enough during their working lives to take care of them during retirement.

- The majority of older people and the general public feel that government should assume financial responsibility for older people who cannot be financially independent.

- The consensus of physicians, hospital administrators, visiting nurses, and family social workers is that a large proportion of older people are very ill. But most persons over 65 years of age would say, "I've a lot of things wrong with me, but I'm not really very sick." The "very sick" comprised about 10 percent of persons over 65 in the survey. If those who were too sick to be interviewed are added, the proportion rises to about 14 percent.

The social and psychological aspects of aging are being examined in the long-term Kansas City study of adult life, a project of the university's Committee on Human Development. In one part of the project, adults between 40 and 70 years old were interviewed to determine their attitudes on aging.

When the interviews were analyzed according to the social classes of respondents, distinct differences in attitude between the classes were revealed. The men of upper status saw old age as beginning around age 70; for men of lower status, old age began around 60. The same trend was evident among women; upper status women thought a woman was old at 70; for those in the lower class, it was 65.

Conceptions of what being old was like differed significantly between upper and lower status respondents. For the upper middle class, old age is pictured as a period of leisure, security, partial retirement, and withdrawal, with emphasis on contentment and resting on one's laurels. For the lower class, old age means full retirement, withdrawal, and progressive physical decline, with deep undertones of pessimism.

Members of the Committee on Human Development have also reported on the possible development of a new "subculture of persons in late maturity." The authors speculated that, as older people increase in numbers, so will their economic and political influence. Membership in a group that is growing in size and power will raise the morale of older people and enable them to select a more active style of life, according to the authors. In the new subculture, there would be emphasis on leisure, freedom of movement, reduced family responsibilities, and spending rather than saving. This pattern of life is most clearly seen today in the retirement communities in the south and southwest, the authors stated.

In another study, conducted by the university's Industrial Relations Center, 166 production workers were examined to determine the extent of differences between younger and older workers. The majority of the workers were found to be physiologically able to continue working past age 65. However, examinations of arteries of the eye showed that one-fifth as many workers aged 60 to 65 compared with those 40 to 45 had normal artery conditions.

When the actual productivity of the two age groups were compared, no significant differences were found. None of the factors measured was a major determinant of productivity for these workers.

Among the many theories about aging that have been formulated at the university is the theory of "disengagement" in which aging is

a process of mutual disengagement between the aging person and society. In this concept old age has its unique developmental features, especially a deeper sense of the inevitability of death. It is a period of integrating life as it has been lived and the final acceptance of the reality of death. With looser ties of obligation to others, the older person can gratify some of his more personal desires and ignore the harsher strictures of social life. The result is a more carefree, self-centered, and idiosyncratic mode of life. This concept of aging as a natural and voluntary separation was put forth by the Kansas City study group of the university's Committee on Human Development.

The fundamental biology of the aging process has been the subject of wide-ranging theories by University of Chicago scientists. Leo Szilard, professor of biophysics, proposed that the basic step in the process of aging is the "aging hit" which makes inactive all genes carried by a chromosome of a somatic cell. He assumed that the frequency of "hits" in an individual organism is probably constant throughout life and is a characteristic of the species. The number of somatic cells able to fulfill their functions in an organism thus decreases with age.

The genetic makeup determines the critical point at which the number of cells "lost" in this manner is so great that the organism loses its capacity to live. Thus the main determinant of the time of death is inherited, since the rate of aging hits varies little among individuals of a species.

An opposing view is held by Dr. George Sacher, radiobiologist in the Argonne National Laboratory, which the university operates for the U.S. Atomic Energy Commission. Uncertainty, as opposed to the certainty of Szilard's genetically determined lifespan, is the keynote in his conception of aging and death. Sacher states, "Certainly genetic factors play a part,

but we believe a full explanation of the mortality rate must take into consideration both heredity and the possibility of chance failure in the organism, due both to inner physiological condition and factors in the external environment."

Chance failure might occur, for instance, when sudden exertion is required of an individual by a chance event in the environment just when his blood pressure is at its highest or lowest rating. "In any system, whether living or manmade, there are limits to how far performance can depart from normal without failure," according to Sacher. "We think the real meaning of aging is the increased probability of failure with age."

Gioacchino Failla, late senior physicist emeritus in Argonne's radiological physics division, based his theory of aging on its similarity to radiation injury. Generalized radiation injury shortens lifespan and, like natural aging, causes premature development of cataracts, graying hair, slowing of reactions, increased incidence of tumors, and wasting away of the iris of the eye.

Since it is known that persistent exposure to low-level radiation produces mutations of essentially the same type that occurs spontaneously, Failla proposed that both aging and generalized radiation damage can be interpreted in terms of the accumulation of mutations in somatic cells. Experiments in genetics have indicated that the greater the mutation rate in germ cells of a species, the shorter its average lifespan is likely to be. Failla assumed that the same sort of relationship applies to mutation in all body cells—the rate of aging in an individual is determined by the mutation rate of body cells. The mutations cause a gradual decrease in the number of normally functioning cells in the human body after middle age, and the effects of this decrease are called aging.

## Legal Note . . . . Air Pollution Control

Provisions of New York City Charter authorizing the regulation or prohibition of "emissions into the open air from any source . . . of any harmful or objectionable substances . . ." held to provide adequate standards for administrative action and to authorize control of paint spray and vapor emissions from automobile shop. *West Bronx Auto Paint Shop, Inc. v. City of New York*, 223 N.Y.S. 2d 984 (N.Y. Supreme Court, Dec. 1961).

Plaintiffs brought this action for a declaratory judgment that spray and vapors emitted from their shop into the outside air did not constitute air pollution within the jurisdiction of the New York City Department of Air Pollution, and that the department had no authority to require them to apply to it for approval of their equipment. The plaintiffs, engaged in the used-auto painting business in New York City, used a compressed air spray gun and a ventilating system. The equipment and the ventilating system were installed in accordance with the rules of the Board of Standards and Appeals and of the New York State Labor Board.

In dismissing the complaint, the court rejected the plaintiffs' arguments: (a) that emissions not resulting from combustion or the use of fuel-burning equipment are not within the control of the department, and (b) that the legislative standard of "harmful and objectionable substances" is inadequate and hence invalid.

The New York City Department of Air Pollution Control was established in 1952 and, as the court noted, under the New York City Charter the head of the department, the commissioner of air pollution control, was given: "jurisdiction to regulate and control the emission into the open air of harmful or objectionable substances, including, but not limited to, smoke, soot, fly ash, dust, fumes, gas, vapors and odors, and any products of combustion or incomplete combustion resulting from the use of fuel-burning equipment or from the heating of fuels or refuse. . . ." (New York City Charter, sec. 1072).

The board of air pollution control was given jurisdiction: "to adopt and amend rules regulating or prohibiting the emission into the open air from any source . . . of any harmful or objectionable substances, including, but not limited to, smoke,

soot, fly ash, dust, fumes, gas, vapors and odors, and the installation, construction, or alteration of equipment giving forth such emissions into the open air insofar as such emissions are concerned" (New York City Charter, sec. 1075).

This grant of authority to the commissioner and the board, said the court, was not limited to products resulting from combustion or the use of fuel-burning equipment, but extended to all emissions of a harmful and objectionable substance from any source and to any equipment giving forth such emissions. "There can be no doubt," declared the court (p. 988), "from the breadth of the language employed, that the legislative intent as evinced by the 1952 enactments was to reach air pollution in its totality from whatever sources and from whatever equipment or industrial process."

Turning next to the sufficiency of the standards for administrative action, the court expressed its view that the statute contemplated "continuing regulation and correction and corrective treatment" of an increasingly intensive and complex problem. Under these circumstances, the court concluded, the legislative standard of "harmful and objectionable" substances was adequate and applicable to the paint spraying operation. As supporting this conclusion, it quoted with approval from a case dealing with water pollution control under a Louisiana statute (*Texas Company v. Montgomery*, 73 F. Supp. 527, 533, aff'd. 332 U.S. 827), that: ". . . it would have been impossible for the legislature to prescribe a formula for the commission's guidance or to lay down rules with reference to harmful pollution applicable to all waters: What might be harmful pollution in one body of water might not be harmful pollution in another. Of necessity, a determination of the facts of what might constitute harmful pollu-

tion was left to a factfinding group. The legislature was compelled to create an agency to administer the act."

While the court recognized that more specific standards had been established for smoke control, it went on to note that "many old and new varieties of emissions from old and new sources have increased and have not yet received the attention given to smoke control, [and] that the increasing intensity and variety of emissions from an increasing number and variety of sources add to the pollution of the air by smoke even in its controlled

state. . . ." The court concluded that "the protection of the public health need not await the point at which equipment and procedures are evolved to afford that protection and reduction in other areas that has been accomplished in the area of smoke control" (p. 993).

The plaintiffs' complaint was therefore ordered dismissed.—SIDNEY EDELMAN, *chief, Environmental Health Branch, Public Health Division, Office of the General Counsel, Department of Health, Education, and Welfare.*

## Exhibits

### Program for Certification of Interstate Milk Shippers

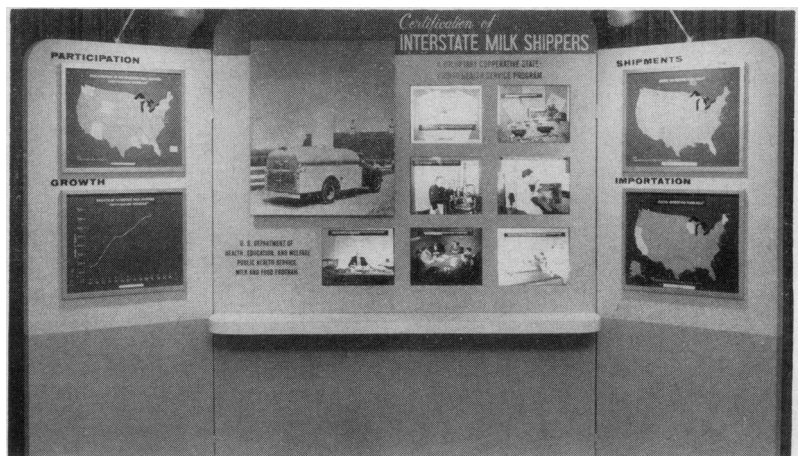
Designed for display at conferences, seminars, and meetings concerned with milk and milk product sanitation, this exhibit describes the Cooperative State-Public Health Service Program for the Certification of Interstate Milk Shippers. By providing data on the sanitary quality of milk shipped across State lines, the program enables States and communities to eliminate duplicate inspection of milk produced outside their jurisdiction. An estimated 9 billion pounds of grade A milk is shipped annually in interstate commerce under this voluntary program.

The program's activities are depicted in color transparencies. Maps and a chart show the number of States participating in the program and the growth of the numbers of shippers covered. The display points out that State-employed sanitarians make inspections, and that their work is standardized and certified by the Public Health Service. The Service also publishes quarterly a list of certified shippers.

The exhibit is available on loan

from the Milk and Food Branch, Division of Environmental Engineering and Food Protection, Public Health Service, Washington 25, D.C. Requests should be made several months in advance of date desired.

The branch will pay costs of shipping and installing at large national and regional meetings. Complete instructions for assembling are attached to the inside door of the packing crate.



**Specifications:** A three-panel exhibit, 7 feet 4 inches high, 11 feet 6 inches wide, and 32 inches deep, total weight approximately 400 pounds including packing crate. Lighting fixtures require one 500-watt outlet. Outside crate measurements are 37 inches wide, 51 inches high, and 85 inches long.

## Environmental Health Training Program, 1962-63

Listed below are all short-term technical courses to be offered by the Public Health Service's Divisions of Occupational Health, Water Supply and Pollution Control, Air Pollution, Radiological Health, and Environmental Engineering and Food Protection from July 1962 through June 1963.

The courses are described in the "Training Program Bulletin" for fiscal year 1963. Copies of the bulletin, other information, and application forms are available from the Chief, Training Program, Robert A. Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati 26, Ohio.

Courses on radiological health that are asterisked are scheduled in a series. As a group they comprise a 10-week course in engineering aspects of radiological health. Applicants may enroll in the series or in the individual courses.

The facility or laboratory where each course is given is indicated by the following code:

DOH—Occupational Health Research and Training Facility, Cincinnati, Ohio.

SEC—Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.

Rock—Radiological Health Laboratory, Rockville, Md.

Mont—Southeastern Radiological Health Laboratory, Montgomery, Ala.

Vegas—Southwestern Radiological Health Laboratory, Las Vegas, Nev.

Win—Northeastern Radiological Health Laboratory, Winchester, Mass.

### 1962

July 9-20: Basic radiological health (211), Win.

July 9-Sept. 14: Engineering aspects of radiological health (231), SEC.

July 9-20: Basic radiological health (211), SEC.\*

July 23-Aug. 3: Occupational radiation protection (212), SEC.\*

Aug. 6-24: Environmental radiation surveillance (224), SEC.\*

Aug. 27-Sept. 7: Reactor safety and hazards evaluation (223), SEC.\*

Sept. 5-7: Sampling and identification of aero-allergens (405), SEC.

Sept. 10-14: Medical X-ray protection (213), SEC or Rock\*.

Sept. 17-28: Urban planning for environmental health (600), SEC.

Oct. 1-12: Plankton identification and control (141), SEC.

Oct. 8-12: Community air pollution (400), SEC.

Oct. 15-19: Control of gaseous emissions (415), SEC.  
Oct. 15-26: Bio-oxidation of industrial wastes (162), SEC.

Oct. 22-26: Control of particulate emissions (413), SEC.

Oct. 22-26: Medical X-ray protection (213), Rock.

Oct. 22-Nov. 2: Basic radiological health (211), SEC.

Oct. 29-Nov. 2: Chemical and physical analysis of dairy products (304), SEC.

Nov. 5-9: Determination of pesticides in dairy products (306), SEC.

Nov. 5-16: Occupational radiation protection (212), SEC.

Nov. 26-30: Radioactive pollutants in water (195), SEC.

Nov. 26-Dec. 7: Basic radiological health (211), Rock.

Nov. 26-Dec. 7: Industrial hygiene engineering (501), DOH.

Nov. 26-Dec. 7: Industrial hygiene chemistry (502), DOH.

Dec. 3-7: Radionuclides in water (222), SEC.

Dec. 3-7: Medical and biological aspects of air pollution (407), SEC.

Dec. 3-14: Chemical analyses for water quality (100), SEC.

Dec. 10-14: Institutional sanitary food service (330), SEC.

Dec. 10-14: Measurement of airborne radioactivity (417), SEC.

Dec. 10-14: Medical X-ray protection (213), Rock.

Dec. 10-20: Emission spectrographic techniques (515), DOH.

Dec. 10-21: Industrial exhaust ventilation (516), DOH.

### 1963

Jan. 7-Mar. 15: Engineering aspects of radiological health (231), SEC.

Jan. 7-18: Medical aspects of radiological health (201), Rock.

Jan. 7-18: Basic radiological health (211), SEC.\*

Jan. 14-25: Industrial hygiene engineering (501), DOH.

Jan. 21-Feb. 1: Occupational radiation protection (212), SEC.\*

Jan. 21-Feb. 1: Microscopic analysis of atmospheric particulates (410), SEC.

Jan. 28-Feb. 1: Analysis and control of noise (507), DOH.

Jan. 28-Feb. 8: Basic radiological health (211), Rock.

Feb. 4-8: Laboratory examination of foods (310), SEC.

Feb. 4-22: Environmental radiation surveillance (224), SEC.\*

Feb. 11-15: Medical X-ray protection (213), Rock.

Feb. 11-15: Microbiological examination of dairy products (305), SEC.

Feb. 11-15: Toxicologic investigative techniques (517), DOH.

- Feb. 11-22: Basic radiological health (211), Vegas.  
 Feb. 18-22: Recent developments in water bacteriology (120), SEC.  
 Feb. 25-Mar. 1: Management of nuclear emergencies (234), Vegas.  
 Feb. 25-Mar. 7: Reactor safety and hazards evaluation (223), SEC.\*  
 Mar. 4-8: Current concepts in occupational medicine (518), DOH.  
 Mar. 4-15: Water quality management (160), SEC.  
 Mar. 11-15: Medical X-ray protection (213), SEC or Rock.\*  
 Mar. 11-22: Industrial hygiene engineering (501), DOH.  
 Mar. 11-22: Industrial hygiene chemistry (502), DOH.  
 Mar. 18-May 24: Engineering aspects of radiological health (231), SEC.  
 Mar. 18-29: Basic radiological health (211), SEC.\*  
 Mar. 18-29: Basic radiological health (211), Rock.  
 Mar. 25-29: Analysis of atmospheric inorganics (409), SEC.  
 Mar. 25-29: Dust evaluation techniques (512), DOH.  
 Mar. 25-29: Analysis of free silica (510), DOH.  
 Apr. 1-5: Medical X-ray protection (213), Rock.  
 Apr. 1-5: Electron microscopy (519), DOH.  
 Apr. 1-12: Occupational radiation protection (212), SEC.\*  
 Apr. 1-12: Urban planning for environmental health (600), SEC.  
 Apr. 1-12: Analysis of atmospheric organics (408), SEC.  
 Apr. 15-26: Organic industrial wastes characterization (101), SEC.  
 Apr. 15-26: Basic radiological health (211), Rock.  
 Apr. 15-May 3: Environmental radiation surveillance (224), SEC.\*  
 Apr. 22-26: Meteorological aspects of air pollution (411), SEC.  
 Apr. 29-May 3: Inorganic industrial wastes characterization (102), SEC.  
 Apr. 29-May 3: Medical X-ray protection (213), Rock.  
 Apr. 29-May 3: Community air pollution (400), SEC.  
 May 6-17: Atmospheric survey (401), SEC.  
 May 6-16: Reactor safety and hazards evaluation (223), SEC.\*  
 May 13-17: Radiological health for nurses (203), Rock.  
 May 20-24: Source sampling for atmospheric pollutants (402), SEC.  
 May 20-24: Radionuclides in foods (340), SEC.  
 May 20-24: Medical X-ray protection (213), SEC or Rock.\*  
 June 3-14: Advanced training for sanitary engineer reserve officers, SEC. Courses 1, 2, and 3. Titles to be announced.  
 June 17-28: Aquatic biology for engineers (140), SEC.

## Neurological and Sensory Disease Service

The Neurological and Sensory Disease Service Program was established in the Public Health Service in January 1962. Its purpose is to advance the application of knowledge gained from research in neurological and sensory disorders, including epilepsy, cerebral palsy, multiple sclerosis, Parkinson's disease, mental retardation, and various types of vision, speech, and hearing defects. It is estimated that more than 10 million persons in the United States are victims of these disorders.

State and local activities in prevention, diagnosis, treatment, and rehabilitation are stimulated and developed by the new program. Consultation, technical services, demonstrations, training, education, and other services are provided to communities directly or by means of grants. The program works in cooperation with State health agencies, medical schools, professional organizations, and other private and public nonprofit groups.

The Division of Chronic Diseases in the Bureau of State Services administers the program in collaboration with the National Institute of Neurological Diseases and Blindness. Dr. Eugene H. Guthrie heads the new program.



# Federal Publications

**Problems in Financing Sewage Treatment Facilities.** *PHS Publication No. 886; 16 pages; 15 cents.*

This report identifies both problems which municipalities are helpless to control, such as inflation and the general level of interest rates, and those which are susceptible to local solution, such as management of bond issues and adoption of good administration practices. It also reviews suggestions for improving the position of municipalities, particularly smaller cities, which at present face the greatest difficulty in borrowing money.

**The Shellfish Sanitation Program of the Public Health Service.** *PHS Publication No. 906; 1962; leaflet.*

This leaflet explains how shellfish become contaminated and the controls and measures used by States, the shellfish industry, and the Public Health Service to insure that only safe shellfish reach the market.

**Report of the Committee on Environmental Health Problems.** *PHS Publication No. 908; 1962; 288 pages; \$1.*

The committee of top level scientific personnel, appointed by the Surgeon General, reports their study of the growing problems of contamination of the environment. The study covers all aspects of the problems and their effects on the health of the people. Recommendations to plan for decades ahead are offered.

**The Fateful Months When Life Begins.** *PHS Publication No. 879; 1961; leaflet; 5 cents, \$3.25 per 100.*

The long-term nationwide research project, being carried out by 15 medical centers, to identify causes of cerebral palsy, mental retardation, and kindred neurological and sensory disorders of infancy and childhood is described. The booklet outlines the

different scientific disciplines and techniques being used to study events and conditions of pregnancy, labor, delivery, and early life which may cause damage to a child's brain. Brain-damaging disorders which medical science has conquered are reviewed and the importance of continued research is stressed.

This research project is directed by the National Institute of Neurological Diseases and Blindness.

**Environmental Health Planning Guide.** *PHS Publication No. 823; revised 1962; 60 pages; 45 cents.*

Designed for use by civic groups and public workers interested in long-range planning for a more healthful community, this has been revised to include radiological health material and an expanded discussion on the role of nonofficial civic organizations in helping to conduct studies. It covers general planning for water, sewerage, air pollution, housing, solid wastes disposal, and radiological health on a metropolitan basis.

**Vital Statistics of the United States, 1959. Vol. I. 552 pages; \$4.50. Vol. II. 554 pages; \$4.25.**

These volumes present final detailed vital statistics for 1959. Volume I contains introductory text on sources, history, classification, and interpretation of vital statistics; analytical summary of the data; and all statistics except general mortality statistics for the United States. Volume II presents the mortality statistics for the United States and each State. Free distribution of these volumes is limited.

The following sections of volume I have been issued as separates, which are available without charge: 2. Marriage and divorce statistics. 3. Natality statistics. 4. Fetal mortality statistics. 5. Life tables. 6. Mortality statistics. 8. Marriages

and divorces, by counties. 9. Detailed marriage statistics for the marriage-registration area. 10. Detailed divorce and annulment statistics for the divorce-registration area. 11. General natality and mortality, by counties, urban and rural areas, and specified urban places. 12. General characteristics of live births. 13. Live births by age of mother and birth order. 14. Fetal deaths (published with section 4). Sections 1, 7, and 15 of volume I are not available as separates.

Eight separate reports on mortality statistics for 1959 have also been published and may be obtained free. These reports, issued as Vital Statistics—Special Reports, volume 54, cover mortality from each cause; leading causes of death; general mortality; mortality from selected causes; mortality from selected causes by age, race, and sex; maternal mortality; infant mortality; and accident fatalities. Some of these contain data for each State as well as for the United States as whole.

**Nursing Homes. An annotated reading list.** *PHS Publication No. 907; 46 pages; 15 cents.*

Compiled to meet the need for information on current thinking on all aspects of nursing home care, this reading list indexes articles under five major headings: programing, patient care and services, environmental health, safety, and administration.

---

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared with Federal support.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Office of Information, Public Health Service, Washington 25, D.C.

The Public Health Service does not supply publications other than its own.

---